

# THE MINERAL INDUSTRY OF VENEZUELA

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Venezuela had 26 million inhabitants in 2004 and was South America's fifth most populous country after Brazil, Colombia, Argentina, and Peru; with an area of 912,050 square kilometers (km<sup>2</sup>), it was South America's sixth largest country. The country's gross domestic product (GDP) in terms of purchasing power parity was \$144.3 billion<sup>1</sup> compared with \$125.8 billion in 2003 (revised) (International Monetary Fund, 2005a§<sup>2</sup>). In real terms, the GDP increased significantly (17.9%) after 2 years of decreases. Higher petroleum prices, the recovery from the petroleum sector shutdown at the end of 2002 and the beginning of 2003, and improved overall economic activity as evidenced by a 32% increase in construction, a 25% increase in manufacturing, and an 11.8% increase in mining were the main reasons for the increase in the GDP. Unemployment decreased and was 13.9% in the second half of 2004; this was a significant change from the first semester in 2003 when unemployment reached 19.2%. The second highest unemployment level (18.3%) was in the hydrocarbons, mining, and quarrying sector. That sector had a 27% unemployment rate during the first half of 2003, which included part of the 2-month strike that shut down petroleum operations and resulted in a massive firing of employees. Despite great improvement in the construction sector in the second half of 2004, the unemployment rate in that sector continued to be the highest at 23.6% compared with 37.3% during the first half of 2003. Inflation was 17.7%, which was an improvement compared with 2003 when it reached 24.3% (Banco Central de Venezuela, 2005b§-d§; U.S. Central Intelligence Agency, 2005§; World Bank, 2005§).

## Government Policies and Programs

Decree 3110 of September 2004, which replaces Decree No. 1850 of 1997, redefines the use of the Itacama Forest Reserve and permits the use of 12% of the forest for mining. This is the region where Las Cristinas gold deposit is found.

The current mining law Decree No. 295 of September 5, 1999, establishes the rules for all mines and minerals (except hydrocarbons and some industrial minerals not found in Government lands) within Venezuelan territory; rules concerning the exploration, production, beneficiation, storage, lease, distribution, transportation, and internal and external marketing of extracted substances not covered in other laws are included. Under Venezuelan law, the country's mineral and hydrocarbon resources belong to the state. Under the decree, the Ministerio de Energía y Minas (MEM) is the Government institution responsible for all matters related to mining activity. Mining is permitted only through direct participation of the Government, concessions, and production authorization to artisanal miners, mining cooperatives, and the small-scale mining sector.

The 1999 mining law established a combined 20-year exploration and production concession renewable for a period not to exceed 20 years. The exploration period for a concession is limited to 3 years with a possible extension of 1 year. The size of a concession is not to exceed 6,156 hectares (ha). Environmental, financial, and technical feasibility studies must be presented to the MEM during the exploration period of the concession. With permission from the MEM, the concession may be rented, subcontracted, or transferred. The surface tax that must be paid beginning in the fourth year of the concession eliminates the exploration tax. At the production phase of the concession, the production tax will be deducted from the surface tax. For gold, silver, and platinum-group metals, the production tax is 3% of the Caracas commercial value of the refined "mineral." Diamond and precious stones are taxed at 4% of the Caracas commercial value. Other minerals are taxed at a calculated 3% of commercial value at the mine. At the discretion of the Executive, the production tax may be reduced to 1% as merited by economic conditions.

The 1999 mining law established the mining cooperative and regulates the artisanal mining sector for the first time. It defines the small mining sector in reference to the production of diamond and gold in areas not to exceed 10 ha to be worked by no more than 30 individuals with a nonrenewable nontransferable permit unless transferred to a social fund to form a mining cooperative. The maximum production period is 10 years.

The Executive also reserves the option of exempting mining entities from import taxes on items indispensable to mining that are not produced in Venezuela. With permission from the Executive, equipment exempted from import taxes may be sold to a third party; in that case, the purchaser pays the import tax. At the expiration of the mining rights, all equipment and installations related to the mining activity become the property of the Venezuelan Government without compensation to the concession holder.

With the exception of precious materials, industrial minerals not found in Government lands continue to be governed by Articles 7 through 10 of the derogated Mining Law of 1945 until the individual States establish regulations.

The Instituto Nacional de Geología y Minería (INGEOMIN) was established as an independent agency ascribed to the MEM under the 1999 Decree. The INGEOMIN was charged to perform interdisciplinary research in the geosciences, and to plan, execute, and coordinate all programs related to the geosciences. The agency was also given the responsibility of evaluating Venezuela's mineral and nonconventional energy resources, providing technical advice to other Government entities and the private sector, and disseminating technical and scientific information.

The General Regulation of the Mining Law—Decree No. 1234 was published on March 9, 2001. The Regulation establishes the terms, conditions, and administrative procedures in support of the Decree No. 295.

In 1975, the Government of Venezuela nationalized the petroleum sector. In November 2001, the new hydrocarbon law Decree No. 1510 was passed. The law became effective on January 1, 2002. Under the decree, all hydrocarbon deposits belong to the nation. In

<sup>1</sup>Where necessary, values have been converted from Venezuelan bolivars (Bs) to U.S. dollars (US\$) at the rate of Bs1,614.06=US\$1.00.

<sup>2</sup>References that include a section mark (§) are found in the Internet References Cited section.

agreement with Article 302 of the Constitution of 1999, all primary hydrocarbon activities are reserved for the Government. Refining and marketing of hydrocarbons (secondary activities) can be by the Government and the private sector jointly or separately.

Primary activities will be carried out by the Government directly by the Executive, by companies owned by the Government, or by companies in which the Government owns more than a 50% interest (mixed enterprises). Companies engaged in hydrocarbon production are denominated operating companies. The maximum area assigned to an operating company is 100 km<sup>2</sup>.

The creation of a mixed enterprise for primary production of hydrocarbons requires the approval of the National Assembly. The duration of the mixed company will be 25 years with a possible extension of 15 years. The extension must be applied for between 12 1/2 and 20 years of the granting of the original permit. The lands and permanent works, which include installations, accessories, and equipment, must be maintained in good working order so that when they are relinquished to the Venezuelan Government, their future use or activity cessation with minimal environmental damage can be guaranteed.

The Government has the right to 30% of production from any deposit as royalty payment. If economic conditions warrant, the Executive has the option of reducing the royalty to 20%. The production royalty from mixed bitumen from the Orinoco Belt can be reduced to 16% if the projects are not viable at the 30% rate. In both cases, the higher royalty rate can be reestablished when necessary. Natural gas is excluded from the hydrocarbon law; it is regulated by the Organic Law of Gaseous Hydrocarbons.

Early in 2005, the Government announced that all petroleum operators working in Venezuela under contracts would have to migrate to joint ventures with the Government, in which the Government would have controlling interest by 2005. During the year, the Government also eliminated a 9-year royalty holiday it had granted the strategic associations formed in the 1990s to extract the extra heavy crude from the Orinoco Belt (Ministerio de Energía y Petróleo, 2005a§; Rigzone.com, 2005§; U.S. Department of State, 2005§).

Decree No. 1257 of 1996, Norms of Environmental Evaluation of Activities Susceptible to Degrade the Environment, established the Ministerio del Ambiente y de los Recursos Naturales (MARN). The law requires an environmental impact study for projects and programs in the areas of mining and hydrocarbons.

## **Production**

In 2004, Venezuela was an important producer of nonfuel mineral commodities in the Latin American region, although it held modest ranking in terms of world output (table 1).

According to U.S. Geological Survey data, Venezuela was the world's 8th ranked producer of bauxite, the 9th ranked producer of alumina, and the 12th ranked producer of aluminum. In Latin America, it was the second ranked producer of primary aluminum (after Brazil), coal (after Colombia), iron ore, and phosphate rock (after Brazil); the third ranked producer of bauxite and alumina (after Brazil and Jamaica) and cement (after Brazil and Mexico); and the fourth ranked producer of steel (after Brazil, Mexico, and Argentina). In the Americas, Venezuela was the third ranked producer of bauxite (after Brazil and Jamaica) and phosphate rock (after the United States and Brazil), the fourth ranked producer of primary aluminum (after the United States, Canada, and Brazil), and the fifth ranked producer of alumina (after the United States, Brazil, Jamaica, and Suriname).

During 2004, Venezuela was the third ranked producer of crude petroleum in the Americas (after the United States and Mexico).

## **Trade**

Venezuela's exports (goods and services) totaled \$39.8 billion in 2004; this was a 42% increase compared with that of 2003 when exports totaled \$28 billion (revised); of the 2004 total, \$31.9 billion (80%) was from petroleum. Exports of goods (f.o.b.) totaled \$38.7 billion, of which \$33.7 (87%) was from petroleum. Total imports increased significantly to \$22 billion, which was a 55% increase compared with that of 2003 (revised). Of the total, \$1.9 billion (8.5%) was from petroleum. Imports of goods (c.i.f.) were \$18.6 billion, of which \$1.4 billion (7.5%) was from petroleum (Banco Central de Venezuela, 2005a§).

Venezuelan exports of crude petroleum and petroleum products to the United States totaled 1.53 million barrels per day (Mbbbl/d) in 2004; this amount represented 11.8% of U.S. import requirements during the year. In April, construction of a new petroleum export terminal was completed at the Port of Jose. As a result, Venezuela's crude export capacity increased by 230,000 barrels per day (bbl/d) (U.S. Energy Information Administration, 2005§).

## **Structure of the Mineral Industry**

The private sector participated in the production of nonfuel minerals in Venezuela; Government companies, however, controlled a varying portion or the entire production of alumina, aluminum, bauxite, diamond, gold, and iron ore (table 2). Alumina, aluminum, and bauxite production was controlled by the Government through Corporación Venezolana de Guayana (C.V.G.). Private international companies held small interests in alumina and aluminum production.

A large portion of Venezuelan gold was produced by C.V.G. or by its subsidiary C.V.G. Compañía General de Minería de Venezuela C.A. (Minerven).

Production of iron ore was nationalized in 1975, and the only producer was C.V.G. Ferrominera Orinoco C.A. (Ferrominera). Steel production became private or privately controlled in 1997 when Siderúrgica del Orinoco C.A. (SIDOR), which was the leading steel producer in Venezuela and the Andean region, was privatized; the Government of Venezuela retained a minority ownership through C.V.G. The ferrosilicon producer C.V.G.–Venzolana de Ferrosilicio, C.A. (now Ferroatlántica de Venezuela, S.A.) was privatized in 1998.

Five private companies produced cement in Venezuela. CEMEX Venezuela S.A.C.A., which was the leading company (in terms of production quantity), was owned by Cementos Mexicanos S.A. de C.V. (CEMEX), which was the world's third ranked cement

company. The Holcim Group of Switzerland and Lafarge S.A. of France, which were the other world-leading cement companies, held interests in Holcim (Venezuela) S.A., and Lafarge (Venezuela), which were the second and third leading cement companies in Venezuela, respectively.

Venezuela was a founding member of the Organization of the Petroleum Exporting Countries (OPEC). Following Venezuela's nationalization of the petroleum sector, Petróleos de Venezuela S.A. (PDVSA) was formed in 1976 as the Government company responsible for the exploration and production of all hydrocarbons. PDVSA also has the responsibility for crude refining and petrochemical manufacturing. Storing, transporting, and domestic and international marketing of hydrocarbons and their products are also the responsibility of PDVSA. Since the early 1990s, however, Corporación Venezolana de Petróleos (CVP) (a subsidiary of PDVSA) began to open opportunities to the private sector through a number of production agreements. The early program involved the restoration of production from inactive wells. CVP also entered into association with the private sector to explore new areas and to develop the extra-heavy crude in the Orinoco Belt.

## Commodity Review

### Metals

**Aluminum and Bauxite and Alumina.**—All Venezuela's bauxite production was from Los Pijiguaos Mine in the State of Bolívar. The mine was owned by C.V.G. Bauxilum C.A. (Bauxilum), which was owned by the Venezuelan Government through C.V.G. (99%) and Aluisse Lonza Holding AG of Switzerland (1%). Bauxilum was also the sole producer of alumina in Venezuela. Bauxite production from Los Pijiguaos fed the alumina refinery owned by Bauxilum. Venezuela's bauxite production capacity was 6 million metric tons (Mt) (table 2). In 2004, bauxite production increased by more than 5% to 5.8 Mt, and production has been increasing steadily since 1997. Production of alumina increased slightly to 1.9 Mt (table 1).

During the year, the Government reported that Russia's leading aluminum producer RUSAL was evaluating the possibility of investing \$480 million in a new bauxite and alumina complex in Caicara del Orinoco, State of Bolívar. The project would mine bauxite, which would be converted to alumina for export (Venezuela Embassy, London, United Kingdom, 2004d\$).

In 2004, production of aluminum increased by almost 4% to 623,540 metric tons (t). Production of aluminum in Venezuela was by two primary smelters in which C.V.G. had a majority ownership. The largest was C.V.G. Venezolana de Aluminio C.A. (Venalum), which had a nominal capacity of 430,000 metric tons per year (t/yr). In 2004, Venalum produced 438,670 t; this was a slight increase compared with that of 2003. The other smelter, C.V.G. Aluminio del Caroní, S.A. (Alcasa), had a design capacity of 210,000 t/yr of aluminum. Production from Alcasa was 184,870 t, which was a 10% increase compared with that of 2003. Apparent consumption increased significantly (by almost 40%) during the year. Only in 1996 had the apparent consumption of aluminum in Venezuela achieved a similar level (206,880 t). Exports of aluminum from Venezuela decreased to 66% of its aluminum production mainly as a result of reduced exports from Venalum (VenEconomía.com, 2005\$).

**Gold.**—Official production of gold in Venezuela increased by 18% to 9,690 kilograms (kg) in 2004 compared with that of 2003 and a 32% increase compared with that of 2000. The leading producer was Hecla Mining Company through its subsidiary Minera Hecla Venezolana C.A., which operated La Camorra underground mine in the State of Bolívar and produced almost 4,100 kg of gold (reported as 130,436 troy ounces), which included about 150 kg (reported as 4,789 troy ounces) that they milled for others and ore purchased from small producers. La Camorra's production (about 3,900 kg) was about 40% of Venezuela's official gold output. Production from La Camorra Mine, which did not include ore purchased or milled for third parties, increased by less than 2% compared with that of 2003 at an average total cash cost of \$180 per troy ounce. At yearend 2004, La Camorra Mine's proven and probable reserves totaled more than 323,000 t with an average grade of 20.57 grams per metric ton (g/t) gold (reported as 356,192 short tons with an average grade of 0.60 troy ounce per short ton). During the year, Hecla built a new production and ventilation shaft to keep costs down. The company expected to increase production to about 4,300 kg in 2005 (Hecla Mining Company, 2005, p. 8; 2005\$).

In addition to La Camorra, Hecla was developing the Isidora Mine, which is located 113 kilometers (reported as 70 miles) north of La Camorra in the Callao mining district (Block B) though a lease with Minerven. Production from Isidora was expected to begin in 2005 and to move into full operation in 2006. Ore produced from Isidora will be hauled by truck to La Camorra mill for processing. Using this mill significantly reduced the capital cost of the development, which was estimated to be \$30 million. La Camorra Unit, which included La Camorra and the Isidora Mines, had proven and probable reserves of about 630,000 t with an average grade of 27.8 g/t gold (reported as 695,157 short tons with an average grade of 0.81 troy ounces per short ton) (Hecla Mining Company, 2005, p. 8-9, 12).

Another gold producer in Venezuela was Crystallex International Corporation of Vancouver, British Columbia, Canada, through its subsidiary Crystallex de Venezuela C.A. Production was from two open pit deposits in the Tomi concession, an underground deposit in the Tomi concession in El Callao mining district, and an underground deposit (La Victoria) in Lo Increible concession. This ore was processed at Crystallex's Revemin mill. The company production increased by 62% to about 1,540 kg, which included 146 kg milled from purchased material. More than 1,300 kg was produced from the Tomi concession. Production from La Victoria was only 75 kg, which was a 56% decrease compared with that of 2003. Low gold production was due to the content of the refractory ore, which reduced the amount of ore suitable for recovery via the conventional cyanide process (Crystallex International Corporation, 2005\$).

Crystallex also was involved in the development of Las Cristinas, through a mining operation agreement with C.V.G. Las Cristinas was the most promising deposit in Venezuela, but has not been developed because of many legal ownership battles over the years. In March 2004, Crystallex announced that C.V.G. had approved the feasibility study for the development of Las Cristinas, which was

completed in September 2003. The study concluded that, using a price of \$325 per troy ounce of gold, proven and probable reserves of the deposit totaled 246 Mt with a grade of 1.29 g/t gold. Later in 2004, the company increased reserves to 333 Mt at a grade of 1.2 g/t gold to reflect the results of drilling after the completion of the September 2003 feasibility study. In March, Crystallex awarded the engineering procurement construction management contract to SNC-Lavalin Engineers & Constructors Inc. In May, Crystallex released a 40,000-metric-ton-per-day (t/d) full feasibility study for Las Cristinas. Other activities at Las Cristinas included submitting the environmental impact assessment (EIA) study in April, confirmation of the land occupation permit in August, and completion of a socioeconomic impact assessment and an environmental supervision plan for the construction phase in September, both of which were submitted to the MARN. During the year, the engineering design work was 66% completed. Construction of the project was scheduled for 2005 with mine startup targeted for 2006 (Crystallex International Corporation, 2004a-d; 2005).

During the year, Bolivar Gold Corp. continued to work on the Choco 10 concession in the Callao mining district in the State of Bolivar. Bolivar Gold, which acquired the property in 2003, reported that in 2004, based on a price of gold of \$375 per troy ounce and a cutoff grade of 0.5 g/t gold, proven and probable reserves totaled 21.4 Mt with a grade of 1.9 g/t gold (about 40,700 kg of gold) (Bolivar Gold Corp., 2005§). In March, C.V.G. approved the feasibility study, and MARN approved the EIS and issued basically all permits that allowed the project to proceed. Bolivar planned to request the production permit from the MEM immediately. While beginning construction of access roads and other infrastructure and installation work, the company planned to continue to explore the property aggressively and assigned a budget of \$4.6 million toward this effort. In August, Bolivar Gold announced that, based on early year exploration, it had revised measured and indicated resources to 31.75 Mt with a grade of 1.7 g/t gold. After these results, the company decided to expand the capacity of the mill, which was under construction, to 10,000 t/d from 4,500 t/d. Commissioning of the plant at the original capacity was anticipated for 2005, and expanding to the higher production level would take place in 2006. With the plant expansion, annual production estimates were revised to more than 5,400 kg (reported as 175,000 troy ounces) (Bolivar Gold Corp., 2004a, b).

**Iron and Steel.**—Production of iron ore from Ferrominera's Cerro San Isidro, Las Pailas, and Los Barrancos open pits increased by 6.7% to 19.2 Mt. During the year, the company invested \$130 million in strategic and operational areas. Of the total, \$83.2 was invested mainly in the concentration plant, improvement in the pellet plant, and work on the reopening of the Altamira Mine. Mineral extraction and transport received \$22.3 million and \$3 million, respectively. Other areas of investment were administration and services, environmental control, and mineral processing. The contract for the concentration plant was awarded to the consortium Met Chem Canada Inc.–Duro Felguera, S.A. The definite process diagram and topographic and geotechnical studies were completed. Construction of the \$225 million plant, which would extend the mining operations by 40 years, began in August. Work was being done on the mineral processing system and financing of Phase I of the plant. In December, Ferrominera and the company Durefco formalized the financing of \$100 million for the first phase of the plant with ABN AMRO Bank N.V. The financing would be backed up by the sale of 300,000 t of briquettes from the Operaciones al Sur del Orinoco S.A. (OPCO) plant, which Durefco would market internationally under a 4-year contract with Ferrominera. In November, Japan Bank International Cooperation made a proposal to finance the second phase of the concentration plant (C.V.G. Ferrominera Orinoco C.A., 2004a§, d§; 2005§; VHeadline.com, 2004§).

Ferrominera signed a contract that would extend the operation and management of the pellet plant by Tecnologías y Operación de Plantas y Procesos C.A. (Toppca) for 5 years. Ferrominera had plans to expand the plant capacity to 4 million metric tons per year (Mt/yr). During the year, Ferrominera also signed an agreement with Cleveland-Cliffs Inc. of the United States for technical support in the areas of environment, operation, process and quality control, maintenance, safety, and training (C.V.G. Ferrominera Orinoco, C.A., 2004b§, c§).

As the price of hot-briquetted iron (HBI) hit a record-high level during the year, efforts were made to increase production in Venezuela. In November, the ownership of Orinoco Iron C.A., which was an HBI producer, changed. With the change, International Briquettes Holding [a subsidiary of Siderúrgica Venezolana S.A. (Sivensa)] became 51% owner of Orinoco Iron. The remainder was transferred by the previous owner BHP Billiton p.l.c. to some of the creditors of Orinoco Iron. Orinoco Iron continued to work on restructuring its debt. During the fiscal year that ended on September 30, 2004, Orinoco Iron, which had a capacity of 2.2 Mt/yr, produced 941,593 t. This 39% increase was due to the added operation of trains 3 and 4 during part of the year (International Briquettes Holding, 2004a, b; C.V.G. Ferrominera Orinoco, C.A., 2004e§).

Another HBI producer was Venezolana de Prereducidos de Caroní C.A. (a subsidiary of Sivensa), increased production to 646,599 t for the fiscal year that ended on September 30, 2004; this was a 34% increase compared with that of 2003 (Siderúrgica Venezolana S.A., 2005, p. 10).

In July, Materiales Siderúrgicos, S.A., which was a joint-venture company between Tenaris S.A. (50.2%) and SIDOR (49.8%), completed the purchase of the Korean steelmaker POSCO's equity in POSVEN, which was a 1.5 Mt/yr HBI plant in Ciudad Guayana for \$120 million. The plant, which was completed in 1997, had operated only briefly in 2000. Tenaris also had a small equity in another HBI plant in Puerto Ordaz, Complejo Siderúrgico de Guayana S.A. (Comsigua). The Comsigua plant had a 1-Mt/yr HBI production capacity. Later in the year, Minerales Siderúrgicos signed a memorandum of understanding with Ferrominera to transfer 15% of its shares in POSVEN to the latter. As part of the agreement, Ferrominera would increase its supply of 2.2 Mt of iron ore and pellets to the domestic market (Tenaris, S.A., 2004, p. 17; Metal Producing & Processing, 2004§; C.V.G. Ferrominera Orinoco C.A., 2005§).

Production of raw steel and direct-reduced iron (DRI) increased by 16% and 2%, respectively. The growth was a result of improved international prices for steel products and a significant economic growth in the country, which increased the demand for steel in the construction, infrastructure, and manufacturing sectors. The two leading producers, Sivensa's Siderúrgica del Turbio C.A., and SIDOR, had significant improvement during the year because of higher domestic and international sales and the high international prices. Sivensa's steel sales for the fiscal year that ended on September 30, 2004, totaled \$280.2 million, which was a 136% increase from that of fiscal year 2003. SIDOR's crude steel production was about 3.6 Mt with shipments of products of about 3.3 Mt despite a

strike during the year. The company expected to produce 4.3 Mt of crude steel in 2005 and 4.6 Mt in 2006. Venezuela's apparent consumption of steel was expected to reach 2 Mt in 2005, which was a result of increased shipments to the petroleum and construction sectors (Siderúrgica Venezolana S.A, 2005, p. 8; Correo del Caroní, 2005§; Radio Nacional de Venezuela, 2005§).

**Nickel.**—In 2000, Venezuela began producing nickel and ferronickel from its Loma de Níquel Mine and ferronickel plant located along the boundaries of the States of Aragua and Miranda. The mine and ferronickel plant were operated by Loma de Níquel C.A. (majority owned by Anglo American plc). In 2004, measured and indicated reserves were 5.5 Mt of ore at a grade of 1.45% nickel (Anglo American plc, 2005, p. 101). Nickel mine production in 2004 was about 20,500 t, which was a slight decrease compared with that of 2003. The nickel content of ferronickel produced was 17,200 t, which was about 92% of the design capacity (tables 1, 2).

### *Industrial Minerals*

**Cement.**—Venezuela was the third ranked cement producer in Latin America and the Caribbean after Brazil and Mexico, despite producing only an estimated 7% of the region's output. Production of cement in 2004 was estimated to have increased by 17%. As a result of increases in infrastructure work, domestic sales increased by about 30% to 3.5 Mt from 2.7 Mt in 2003. Venezuela was a net exporter of cement (El Universal, 2005§).

**Diamond.**—Official production of diamond increased by about 15% in 2004. Traditionally, diamond in Venezuela has been produced by small-scale producers either through cooperatives or under contract with C.V.G. The main producing areas were Aza Karon, Guaniamo, Icabaru, Santa Elena, and San Salvador de Paul.

Kansai Mining Corporation Limited of Canada through its subsidiary Compañía Minera Adamantine, C.A. held two concessions in the Guaniamo diamond province in the State of Bolívar. The Natal I and II concessions, which had a combined area of 6,368 ha, were under a contract with C.V.G. and were valid until 2013 with possible extensions of 10 years each. In 2004, Kansai purchased a processing plant for the project, but severe weather conditions during the year delayed progress in plant installation and other work. Owing to torrential rains in the area, access roads to the areas had to be resurfaced. The company expected to begin bulk sampling in 2005 (Kansai Mining Corporation Limited, 2004, 2005§).

### *Mineral Fuels*

Although by law, the petroleum sector is reserved for the Government, private companies participated in exploration and production of hydrocarbons in Venezuela through a number of agreements with the Government. In 2004, the Government announced that it had signed several agreements with China that would facilitate China's participation in natural gas and crude petroleum exploration and production and in the refinery product area in Venezuela. According to the Government, Chinese companies planned to invest \$410 million in Venezuela, \$350 million of which would go to the oilfields and \$60 million, toward the natural gas sector (Venezuela Embassy, London, United Kingdom, 2004a§).

**Coal.**—Production of coal in Venezuela increased by about 16% to 8.1 Mt. Most of the production was from the State of Zulia where Carbozulia S.A. (formerly a subsidiary of PDVSA) was transferred to the Government's Corporación del Desarrollo de la Región Zuliana (Corpozulia) in two joint ventures with the private sector, Carbones del Guasare, S.A. and Carbones de la Guajira, S.A. Carbones del Guasare's Paso Diablo Mine produced an estimated 6.7 Mt. Based on calculations by Anglo American plc, the Paso Diablo Mine had salable coal reserves of 152 Mt (Anglo American's share was 38 Mt). In December 2004, Peabody Energy Corp. purchased a 25.5% interest in the Carbones del Guasare by acquiring RAG Coal International AG's share of the company for \$32 million. Carbones de la Guajira operated the Mina Norte in the Paez municipality, which had open pit reserves of 57 Mt. Inter-American Coal Holdings N.V. owned 64% of Carbones de la Guajira and Carbozulia owned the remainder (Peabody Energy Corp., 2004; Anglo American plc, 2005, p. 116; Anglo Coal, 2005, p. 4; Carbones de la Guajira, S.A., 2005§).

Excel Coal Limited of Australia had a 31% interest in the Cosila (Las Carmelitas) project in the Guasare Basin through its subsidiary Excelven Pty. Ltd. In September, Excelven became the majority owner of the Cosila project when it completed the purchase of a 10% share from a private investor. Production for the Cosila project, which had an estimated cost of \$40 million, was planned for 2 Mt/yr for 15 years, all of which would be exported. The company planned to begin production in 2006 (Excel Coal Limited, 2004; 2005a§, b§; CoalTrans International, 2005).

In late 2004, Venezuela agreed to export 500,000 t of coal to Cuba for a powerplant that was being built by the Chinese. Under the preliminary agreement, Corpozulia would supply the coal to Cuba (Canadian Foundation for the Americas, The, 2005§).

**Natural Gas.**—Production of natural gas in Venezuela increased by an estimated 9%. Production of nonassociated gas from the Yucal Placer field began in April. The Yucal field was one of the six non-associated blocks awarded in 2001 to the private sector. Total S.A. of France (69.5%) was the majority partner in the venture that included Repsol-YPF S.A. of Spain and other partners. Early production was about 2,830 cubic meters per day (reported as 100 million cubic feet per day), but plans called for a production increase to about 8,500 cubic meters per day (reported as 300 million cubic feet per day) by 2007 (Total S.A., 2004).

Also during the year, Repsol-YPF announced the discovery of natural gas in the Barrancos project, which is located in the States of Barinas, Portuguesa, and Trujillo. The company planned to produce gas from this project for an 80-megawatt (MW) powerplant to be built in the State of Portuguesa. The plant would start operating at midyear 2005. Other plans for the production from this field, which was expected to reach 2 million cubic feet per day in 2006, were to supply gas to a 450-MW plant in the State of Barinas (Repsol-YPF S.A., 2004§).

In agreement with the long-term plans of increasing the importance of the natural gas sector, the Government of Venezuela announced that it had inaugurated the first phase of the \$470 million natural gas pipeline to connect the gas production and

distribution plants in eastern and western Venezuela and that eventually the pipeline will be extended to export natural gas to Colombia and to some countries in Central America and South America (Venezuela Embassy, London, United Kingdom, 2004b§).

**Petroleum.**—Venezuela produced an estimated 1.1 billion barrels of crude petroleum in 2004. In 2003 (the last year for which data were available), about 57% of Venezuela's crude production was from the Oriental Basin, and 40% was from the Maracaibo Basin. During that year, about 31% of the Venezuelan production was by the Government in joint venture with the private sector through operation contracts or strategic associations. Production from operation contracts totaled 170 million barrels (Mbbbl); production from strategic associations totaled 156.6 Mbbbl. The strategic associations were formed to expand Venezuela's production by developing the extra-heavy crude in the Orinoco Belt. Of the associations in production in 2003, Sincruos de Oriente C.A. (Sincor) had the largest output with 57.6 Mbbbl (Ministerio de Energía Y Minas, 2004, p. 39).

**Refinery.**—PDVSA operated six petroleum refineries in Venezuela. In 2003, production of refined products increased by about 6%. In 2003 (the last year for which data were available), the Amuay refinery in the State of Falcon, which was the leading producer, processed 44% of the crude. Cardon, which is also located in the State of Falcon, was the second largest refinery in Venezuela; it processed about 28% of Venezuela's crude (Ministerio de Energía y Minas, 2004, p. 45).

## Outlook

Venezuela's real GDP was expected to continue to grow in 2005 and 2006, although at a slower rate than during 2004. Projections called for a 7.8% increase in 2005 and a 4.5% increase in 2006 (International Monetary Fund, 2005b§).

SIDOR planned to increase its liquid steel production to 4.3 Mt in 2005 and to 6 Mt in 2006, in part, because of the strong demand for steel and the company's strategic goal. The company planned to invest \$70 million to achieve this expansion (Siderúrgica del Orinoco C.A., 2006).

Exports of coal from Venezuela were expected to increase to 19 Mt in 2009 and to 27.5 Mt in 2013 with expansions of existing mines and the development of projects that have been in the plans for some time. The largest increase is expected from the development of the Socuy project, which was scheduled to begin production in 2006 and to slowly increase production to 3 Mt in 2009, 8 Mt in 2011, and 10 Mt by 2012, but which required the development of a new port and transportation system (Correal, 2004, p. 5, 19, 21).

The Government of Venezuela planned to increase natural gas production from 178 million cubic meters per day (reported as 6.3 billion cubic feet per day) to 326 million cubic meters per day (reported as 11.5 billion cubic feet per day) by 2012; this effort would supply the country's domestic needs and planned export markets. As part of its long-term strategy, the Government wanted to develop the natural gas industry, in part, to replace hydroelectric power supply to the northwestern part of the country, which would reduce the transmission costs to the region. Another significant part of the strategy was to become a supplier of natural gas to other countries from Latin America and the Caribbean (Venezuela Embassy, London, United Kingdom, 2004c§; Petróleos de Venezuela, S.A., 2005§).

Under the Plan Siembra Petrolera, the Government of Venezuela sought to recover and rationalize petroleum production by seeking control of the production from the operation contracts that resulted from the opening of the sector in the 1990s. The plan's (2006-12) main areas of investment of the planned \$56 billion would be to quantify and certify the reserves in the Orinoco Belt, develop the Orinoco Project, ensure gas exports for 30 years from the Delta-Caribe offshore gas project, increase refinery capacity by expanding existing refineries and building three new refineries, and substitute the lead additive in gasoline. Two other areas under the plan concern infrastructure and integration with Brazil and the Caribbean region. The Government planned to increase crude petroleum production to 5 Mbbbl/d by 2009 (Alexander's Gas & Oil Connections, 2005§; Ministerio de Energía y Petróleo, 2005b§).

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TABLE 1  
VENEZUELA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	2000	2001	2002	2003	2004
<b>METALS</b>					
Aluminum:					
Alumina	1,755	1,833	1,901 <sup>r</sup>	1,882	1,900
Bauxite	4,361	4,585 <sup>r</sup>	5,191	5,446	5,842
Metal, primary, unalloyed metric tons	570,870 <sup>r</sup>	570,580 <sup>r</sup>	605,290 <sup>r</sup>	601,290	623,540
Gold, mine output, Au content kilograms	7,332	9,076	9,465	8,190	9,690
Iron and steel:					
Iron ore and concentrate, gross weight	17,350	16,902	16,684 <sup>r</sup>	17,954	19,196
Iron ore and concentrate, metal content	11,092	10,817	11,092 <sup>r</sup>	11,936	12,669
Metal, direct-reduced iron	6,401	5,903 <sup>r</sup>	6,824 <sup>r</sup>	6,645	6,800
Ferrous alloys:					
Ferromanganese	15,655	12,715	-- <sup>r</sup>	--	--
Ferronickel	133	32,300	51,700 <sup>r</sup>	57,300	60,000 <sup>e</sup>
Silicomanganese	69,735	56,640	36,794 <sup>r</sup>	30,632	30,000 <sup>e</sup>
Ferrosilicon <sup>2</sup>	56,926	46,236	99,576 <sup>r</sup>	90,543	100,000 <sup>e</sup>
Total	142,449	147,891	188,070 <sup>r</sup>	178,475	190,000
Steel, crude	3,835	3,814	4,164 <sup>r</sup>	3,930	4,575
Semimanufactures, hot-rolled	2,858	2,797	3,000 <sup>e</sup>	2,900 <sup>e</sup>	3,400 <sup>e</sup>
Lead, secondary, refined <sup>c</sup> metric tons	30,000	30,000	30,000	30,000	30,000
Nickel:					
Mine output, Ni content do.	2,540	13,600	18,600 <sup>r</sup>	20,700	20,468
Ferronickel, Ni content do.	40	9,700	15,500 <sup>r</sup>	17,200	17,200
<b>INDUSTRIAL MINERALS</b>					
Amphibolite	--	14,230	18,610 <sup>r</sup>	3,520	20,000 <sup>e</sup>
Cement, hydraulic	8,600	8,700 <sup>e</sup>	7,000	7,700 <sup>r</sup>	9,000
Clays:					
Kaolin	--	--	--	--	--
Other	2,319	4,664	2,643 <sup>r</sup>	2,600 <sup>e</sup>	2,600
Diamond:					
Gem carats	29,280	14,321	45,707	11,080	15,000 <sup>e</sup>
Industrial do.	80,317	27,826 <sup>r</sup>	61,060	23,710	25,000 <sup>e</sup>
Total do.	109,597	42,147	106,767	34,790	40,036
Feldspar	130	142	147	149	176
Gypsum	25	5	-- <sup>r</sup>	-- <sup>e</sup>	-- <sup>e</sup>
Lime	400 <sup>3</sup>	400 <sup>e</sup>	400 <sup>e</sup>	400	400 <sup>e</sup>
Nitrogen, N content of ammonia	423	808	884 <sup>r</sup>	731 <sup>r</sup>	1,012
Phosphate rock:					
Gross weight	389	399	390 <sup>r</sup>	260	300
Content of P <sub>2</sub> O <sub>5</sub>	105	114	111	75	85
Pyrophyllite <sup>e</sup>	32	32	32	32	32
Salt, evaporated <sup>e</sup> metric tons	350,000	350,000	350,000	350,000	350,000
Serpentinite, crushed <sup>e</sup>	550	550	550	550	550
Stone, sand and gravel:					
Stone:					
Dolomite	12	66 <sup>r</sup>	92	100 <sup>e</sup>	100 <sup>e</sup>
Granite	581	796	750 <sup>e</sup>	750 <sup>e</sup>	750 <sup>e</sup>
Limestone <sup>4</sup>	11,302	18,158	13,434	13,500 <sup>e</sup>	13,500 <sup>e</sup>
Sand and gravel	3,106	8,601	4,677	3,637 <sup>r</sup>	2,878
Silica sand <sup>4</sup>	422	627	690	700 <sup>e</sup>	700 <sup>e</sup>
Sulfur, petroleum byproduct	328	322	283	300	300 <sup>e</sup>
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Carbon black <sup>e</sup>	60	60	60	60	60
Coal, bituminous	7,910	7,685	8,097	7,034	8,107
Gas, natural:					
Gross million cubic meters	61,878 <sup>r</sup>	62,941 <sup>r</sup>	61,982	61,027 <sup>r</sup>	67,000 <sup>e</sup>
Marketed do.	36,597	35,347 <sup>r</sup>	33,124	30,875 <sup>r</sup>	34,000 <sup>e</sup>
Natural gas liquids:					
Natural gasoline thousand 42-gallon barrels	10,673 <sup>r</sup>	11,284 <sup>r</sup>	11,847 <sup>r</sup>	9,232 <sup>e</sup>	10,100 <sup>e</sup>
Liquid petroleum gas do.	53,258 <sup>r</sup>	53,696 <sup>r</sup>	53,411 <sup>r</sup>	43,915 <sup>e</sup>	48,300 <sup>e</sup>
Total do.	63,931 <sup>r</sup>	64,980 <sup>r</sup>	65,258	53,147 <sup>e</sup>	58,400 <sup>e</sup>

See footnotes at end of table.

TABLE 1--Continued  
VENEZUELA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	2000	2001	2002	2003	2004
MINERAL FUELS AND RELATED MATERIALS--Continued					
Petroleum:					
Crude <sup>5</sup> thousand 42-gallon barrels	1,151,436	1,219,746 <sup>r</sup>	1,092,806 <sup>r</sup>	1,025,508 <sup>r</sup>	1,100,000 <sup>e</sup>
Refinery products:					
Liquefied petroleum gas do.	4,530	4,931	4,395 <sup>r</sup>	5,355 <sup>r</sup>	5,500 <sup>e</sup>
Gasoline, motor do.	73,460	74,128	64,386 <sup>r</sup>	52,374 <sup>r</sup>	75,000 <sup>e</sup>
Naphtha and other gasolines do.	66,350	63,601	52,027 <sup>r</sup>	40,157 <sup>r</sup>	60,000 <sup>e</sup>
Jet fuel do.	34,226	32,233	29,784 <sup>r</sup>	25,955 <sup>r</sup>	30,000 <sup>e</sup>
Kerosene do.	--	157	77 <sup>r</sup>	117 <sup>r</sup>	120 <sup>e</sup>
Distillate fuel oil do.	116,176	110,642	96,725 <sup>r</sup>	96,108 <sup>r</sup>	100,000 <sup>e</sup>
Lubricants do.	1,880	1,814	1,467 <sup>r</sup>	1,142 <sup>r</sup>	1,200 <sup>e</sup>
Residual fuel oil do.	92,046	92,914	84,479 <sup>r</sup>	85,052 <sup>r</sup>	80,000 <sup>e</sup>
Asphalt do.	12,297	11,581	10,012 <sup>r</sup>	5,402 <sup>r</sup>	5,500 <sup>e</sup>
Petroleum coke do.	10,454	11,362	12,279 <sup>r</sup>	9,994 <sup>r</sup>	10,000 <sup>e</sup>
Parafins do.	193	150	1,288 <sup>r</sup>	241 <sup>r</sup>	250 <sup>e</sup>
For internal consumption do.	24,667	28,010	28,258 <sup>r</sup>	24,809 <sup>r</sup>	30,000 <sup>e</sup>
Unspecified do.	2,295	1,447	1,124 <sup>r</sup>	2,124 <sup>r</sup>	1,000 <sup>e</sup>
Gains and losses do.	-281	-3,409	38,460 <sup>r</sup>	41,468 <sup>r</sup>	1,930 <sup>e</sup>
Total <sup>6</sup> do.	438,293	429,561	424,761 <sup>r</sup>	390,298 <sup>r</sup>	400,500 <sup>e</sup>

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through December 31, 2005.

<sup>2</sup>Production of 75% silicon-content ferrosilicon.

<sup>3</sup>Excludes production under contract with the Government.

<sup>4</sup>Reported figure.

<sup>5</sup>Includes condensate and bitumen for the production of Orimulsión®.

<sup>6</sup>Excludes byproduct sulfur, which is reported in the industrial minerals portion of this table, but includes losses.

TABLE 2  
VENEZUELA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	C.V.G. Bauxilum C.A. (Corporación Venezolana de Guayana, 99%, and Alusuisse Lonza Holding, 1%)	Ciudad Guayana, Bolivar State	1,800.
Aluminum	C.V.G. Aluminio del Caroní, S.A. (Corporación Venezolana de Guayana, 82%, and Alcoa, 7.3%)	do.	210.
Do.	C.V.G. Venezolana de Aluminio C.A. (Corporación Venezolana de Guayana, 80%, and Showa Denko K.K., Kobe Steel Ltd., Sumitomo Chemical Co. Ltd., Mitsubishi Materials Corp., Mitsubishi Aluminum Co., and Marubeni Corp., 20%)	do.	430.
Bauxite	C.V.G. Bauxilum C.A. (Corporación Venezolana de Guayana, 100%)	Los Pijiguaos, Bolivar State	6,000.
Cement	CEMEX Venezuela, S.A. C.A. (Cementos Mexicanos S.A. de C.V., 100%)	Barquisimeto, Lara State; Maracaibo, Zulia State; Pertigalete, Anzoategui State; San Cristobal, Tachira State	4,600.
Do.	LaFarge Venezuela (Lafarge Group, France, 56.2%)	La Vega, Miranda State and San Cristobal, Tachira State	1,750.
Do.	Holcim (Venezuela) S.A. (Holcim Group, 50%)	Carupano, Sucre State; San Sebastian de los Reyes, Aragua State	2,200.
Do.	C.A. Fábrica Nacional de Cementos (Lafarge France, 46.13%)	Palmira and Ocumare del Tuy, Miranda State	1,330.
Do.	Cementos Catatumbo (Lafarge France, 23.32%)	Montellano, Zulia State	650.
Do.	Cemento Andino	Curcas, Trujillo State	560.
Coal	Carbones del Guasare, S.A. (Carbozulia S.A., 49.6%; Peabody Energy Corp., 25.5%; Anglo Coal, 24.9%)	Paso Diablo, Zulia State, Guasare coal basin	7,000.
Do.	Carbones de la Guajira, S.A. (InterAmerican Coal Holdings NV, Mina Norte and Cachiri, Zulia State, Guasare 64%, and Carbozulia S.A., 36%)	coal basin	1,200.
Ferronickel	Loma de Níquel C.A. (Anglo American plc, 91.4%)	Loma de Niquel, Aragua and Miranda States	18.
Ferrosilicon	Ferroatlántica de Venezuela, S.A. (Ferroatlántica S.L., 80%, and Corporación Venezolana de Guayana, 20%)	Ciudad Guayana, Bolivar State	80.
Gold	kilograms Revemin (Crystallex de Venezuela C.A., 51%, and Corporación Venezolana de Guayana, 49%)	Remevin mill, El Callao, Bolivar State	1,500 mill.
Do.	do. El Callao Mining Corp. (Crystallex de Venezuela C.A., 80%)	La Victoria (Lo Increible), El Callao, Bolivar State	1,700.
Do.	do. Crystallex de Venezuela C.A. (Crystallex International Corp., 100%)	Tomi Mine, El Callao, Bolivar State	1,100.
Do.	do. Minera Hecla Venezolana C.A. (Hecla Mining Inc.)	La Camorra, El Callao, Bolivar State	4,000.
Do.	do. C.V.G. Compañía General de Minería C.A. (C.V.G. Ferrominera Orinoco C.A., 66.77%, and Corporación Venezolana de Guayana, 33.23%)	Colombia and Union Mines and Caratal and El Peru plants, El Callao, Bolivar State	4,600 plant.
Iron ore	C.V.G. Ferrominera Orinoco C.A. (Corporación Venezolana de Guayana, 100%)	Cerro San Isidro, Los Barrancos, and Las Pailas, Bolivar State	25,000.
Iron ore pellets	do.	Ciudad Guayana, Bolivar State	3,600.
Do.	Siderúrgica del Orinoco C.A. (Cosorcio Siderúrgico Amazonia Ltd., 70%, and Corporación Venezolana de Guayana, 30%)	do.	7,000.
Direct-reduced iron	do.	do.	4,600.
Hot-briquetted iron	Complejo Siderúrgico de Guayana C.A. (Kobe Steel, 36.7%; C.V.G. Ferrominera, 17.4%; Tubos de Acero de México, S.A., 6.9%; Mitsui and Co. Ltd., Nissho Iwai Corp., Tomen Corp. and Shinsho Corp., 30.3%; International Finance Corp., 8.7%)	do.	1,000.
Do.	Orinoco Iron (International Briquettes Holding, 100%)	Puerto Ordaz, Bolivar State	2,200.
Do.	Venezolana de Prereducidos de Caroní (International Briquettes Holding, 100%)	do.	815.
Lime	C.V.G. Compañía Nacional de Cal (Corporación Venezolana de Guayana, 100%)		500.
Natural gas	million cubic meters Petróleos de Venezuela S.A. (Government, 100%)	Processing plants in Anzoategui, Monagas, and Zulia States	25,000.
Nickel	Loma de Níquel C.A. (Anglo American plc, 91.4%)	Loma de Niquel, Aragua and Miranda States	22 mine.

TABLE 2--Continued  
VENEZUELA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Nitrogen content of ammonia		Fertilizantes Nitrogenados de Oriente S.A. (Pequiven, 35%; Koch Industries, 35%; Snamprogetti International S.A., 20%; Empresas Polar, 10%)	Jose, Anzoategui State	1,070.
Do.		Pequiven (Petróleos de Venezuela S.A., 100%)	Petrochemical complexes in Zulia and Carabobo States	670.
Petroleum:				
Crude	million 42-gallon barrels	Petróleos de Venezuela S.A. (Government, 100%)	Fields in Anzoategui, Apure, Falcon, Guarico, Monagas, and Zulia States	1,393.
Crude, synthetic <sup>1</sup>	do.	Petrozuata (Conoco Inc., 50.1%, and Petróleos de Venezuela S.A., 49.9%)	Jose Industrial Complex, Anzoategui State	40.
Do.	do.	Cerro Negro (Exxon Mobil Corporation, 41.665%; Petróleos de Venezuela S.A., 41.665%; Veba Oil & Gas, 16.67%)	do.	40.
Do.	do.	SINCOR (Total S.A., 47%; Petróleos de Venezuela S.A., 38%, and Statoil ASA, 15%)	do.	67.
Refinery products		Petróleos de Venezuela S.A. (Government, 100%)	Refineries in Amuay and Cardon, Falcon State; State; Puerto La Cruz and San Roque, Anzoategui State; El Palito, Carabobo State; Bajo Grande, Zulia State	475.
Steel		Siderúrgica del Orinoco C.A. (Amazonia Consortium, 70%, and Corporación Venezolana de Guayana, 30%)	Ciudad Guayana, Bolivar State	3,750.
Do.		Siderúrgica del Turbio C.A. (Siderúrgica Venezolana Sivena S.A., 100%)	Antimano, Miranda State; Barquisimento, Lara State; Casima, Bolivar State	840.
Sulfur		Petróleos de Venezuela, S.A. (Government, 100%)	Refineries in Amuay and Cardon, Falcon State; El Palito, Carabobo State; San Roque, Anzoategui State	422.
Do.		Petrozuata (Conoco Inc., 50.1%, and Petróleos de Venezuela S.A., 49.9%)	Jose Industrial Complex, Anzoategui State	53.

<sup>1</sup>Extra-heavy crude processing, assumed 330 days per year of operation.